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ABSTRACT

Five elements of teaching style which are directly related to effective learning patterns are identified: (1) warmth--monitoring seatwork, communicating awareness of behavior, providing individual assistance; (2) cognitive organization--feedback, fast-paced activities, variety of learning drills; (3) orderliness--rules, smooth transitions, fostering independence and responsibility; (4) indirectness--accepting student feelings, minimizing oral directions; and (5) problem solving abili--delving, questioning skills. Each of these teaching styles is discussed as it links with and accommodates the differing learning styles of students and enhances student achievement. (JD)

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TEACHER BEHAVIOR-STUDENT LEARNING STYLE:

A VITAL LINK

By

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TEACHER BEHAVIOR-STUDENT LEARNING STYLE

A VITAL LINK

The "chain" of events that comprises effective instruction has received its share of attention. Yet, no singular "bandwagon" effort has met the criterion of quality education for all. No panacea is on the horizon; however, meshing effective teaching strategies, time frames and supportive learning environments holds promise. Individually, the "links" of teacher behavior and learning style are vital to successful instruction; coupled they provide a bond essential in the learning process.

Today's educators are challenged to detect and implement patterns that facilitate learning (Hart, 1983). Numerous patterns will emerge in this search. The majority of these patterns impact the instructional program, yet teachers have little control over them. There is an exception -- a critical one. Teachers have control over their own behavior, and their behavior makes a difference! Thus making use of effective behaviors in the classroom increasingly important. Classroom teachers are the single most important element in the interactive process teaching (Research Report, 1976). This is a very powerful position, one over which teachers have control and are rightly held accountable. It's a bit overwhelming for some and certainly challenging for the rest.

What teachers do and how they do it relate to style. Style in terms of learning environments in which supportive and motivating interactions are modeled and instructional formats enable teachers and students to use their abilities and talents in the most effective and efficient manner (Tomlinson, 1980).

TEACHER BEHAVIORS

Research efforts in the past decade have supported conclusions with respect to teacher behavior and the impact of these behaviors on student progress (Gage, 1978; Veldman and Brophy, 1974; Sanford and Evertson, 1980; Berliner and Rosenshine, 1979). Lists of effective teaching behaviors could be provided. For this purpose, the summary by Gage (1978) from his review of the literature provides pertinent reference. Gage identified five characteristics related to effective teaching. The five teacher behaviors include:

1) warmth - monitoring seatwork, communicating awareness of behavior providing individual assistance
2) cognitive organization - feedback, fast-paced activities; variety of learning drills
3) orderliness - rules, smooth transitions, fostering independence and responsibility
4) indirectness - accepting student feelings; minimize oral directions
5) problem solving ability - delving, questioning skills

These elements of teaching style are also directly related to effective learning patterns. Weaving these two aspects of the teaching-learning process into meaningful instruction is basic if what teachers do is to make a positive difference in student achievement. Interwoven within these cognitive styles are patterns supporting the affective domain for teachers who demonstrate "facilitative" conditions of genuineness and respect influence learning (Aspy, 1977). Weinstein and Fantini (1970) emphasize the need for personal regard in their statement that cognitive knowledge to the exclusion of feelings limits the likelihood of influencing behavior. Research has shown that teaching patterns to enhance a sense of identity and affiliation for students are reflected in student achievement (Murphy, 1982). At the same time, a teacher's sense of efficacy is directly related to student growth (Berman and McLaughlin, 1980). Teachers who involve all students in learning, using a balance of

affective and cognitive behaviors make a difference (Kerman, 1978; Munroe, 1981).

LEARNING STYLES

Stating that schools have an obligation to help teachers and learners understand how and why human beings learn, Gregorc (1979) provides a foundation for operationalizing cognitive style concepts.

Learning style refers to the method of introducing material and points to the need to gear instruction to learner strengths. Educators recognize that some learn quite well through independent efforts while others need highly structured situations, still others may require more concrete illustrations, several repetitions and/or consistent reinforcement. Carroll (1963) defined quality instruction as the degree to which presentation, explanation and ordering of elements matches learner need. Adapting teaching strategies to accommodate learner optimal style enhances student achievement (Dunn and Dunn, 1977; Hill, 1971; Fourier, 1980). Indeed access to learning is enhanced through provisions to identify and accommodate preferred modalities. That access is determined by teacher attitude and behavior regarding the impact of cognitive style on the learning environment. Before specific style factors are examined, the concept of cognitive or thinking patterns requires clarification. Basically, this concept requires a distinction between style, ability and achievement. Style refers to one's preferred manner of making meaning. Cognitive style doesn't deal with level of achievement or with academic ability; its value rests in examining teacher behavior, learning modes and learners from a non-judgmental base. Learning style is not "good" or "bad", "right" or "wrong". Modality preference is to a degree situational. Since style is flexible it reflects only the dominant mode; however, learners gain some benefits from instruction in other modes as well (Fischer and Fischer, 1979).

Matching learner preference to instruction provides a base and opportunity for success. Mismatching of styles, after a foundation learning skill is developed, provides the opportunity to devise coping techniques and skills to adjust learning, thus, enabling the learner a degree of control over his/her learning. Ownership and responsibility for how one will progress impacts on internality or locus of control, a factor positively related to success in school (Vasquez, 1974). Learning styles suggest the necessity of self-knowledge, balance alignment and stretching (Gregorc, 1979). Fourier (1980) reported self-knowledge resulted in student achievement gains when there was no involvement on the part of the instructor. Value in knowing one's cognitive style is reflected in both academic and non-academic learning. Balance in matching and accommodation to mismatching is stressed in life-long learning habits (Eberhardt, 1980). Individuals are capable of developing skill levels (stretching) in areas where preferences may not match the requirements of the learning environment (Buchanan, 1981).

LINKING TEACHING AND LEARNING STYLES

Selected interactive patterns and learning preferences have been aligned to illustrate their implication for instruction. Effective teacher behaviors represent the interactive nature of quality instruction and what teachers do. The manner in which these patterns are distributed to all students will determine their effectiveness. To learn, students must have the opportunity, thus requiring equitable access for all learners. Research indicates teachers have different sets of expectations for learners and these expectations influence the quality and quantity of learning experiences and subsequently student achievement (Rosenthal, 1968; Good and Brophy, 1978).

Monitoring

The teaching behavior monitoring refers to the manner in which the learning environment is managed. Management defined as supervision to maximize

student opportunity to learn focuses on academic content. The behavior monitoring, is emphasized in direct instruction and mastery learning techniques to facilitate feedback to students (Bloom, 1978; Rosenshine, 1981). Moving within arm's distance of students provides the teacher opportunity to correct exercises in practice, at the same time communicating to pupils awareness of their behavior (Gage, 1978). Soar (1972) emphasized the effectiveness of monitoring, noting that unsupervised seatwork produced only 8 percent on-task behavior; whereas, supervised small group work had 80 percent focused learning time. Circulating throughout the learning environment maintains on-task behaviors and enables the teacher to gear seatwork to realistic time periods (Neff and Pilch, 1976). Feedback to the teacher should identify a productive time frame or the need to reteach segments. The availability of the teacher to provide individual help, prompt feedback and to modify and pace independent work showed productivity (Brophy, 1979; Rosenshine and Berliner, 1978). The skills of effective monitoring produce positive results in large or small group arrangements. The traditional classroom formats of competitive, cooperative, individual goals singly and collectively require the close supervision defined as monitoring. The technique of choral or unison response provides monitoring of all students according to its proponents. Effectiveness of any strategy, like monitoring, in large group settings is dependent upon cues or specific patterns and signals the teacher provides. Managing small group settings allows the teacher proximity with several students, at the same time, at least, visually monitoring the remainder of the class.

Circulating throughout the classroom helps to build awareness that proximity with the teacher is O.K. It is safe to have teacher nearby. In developing this awareness, it is important to recognize learning preferences associated with physical and social distance, feelings of others, and body language.

Judging the appropriate distance requires the establishment of trust. A student's knowledge that the teacher moves to everyone may help to build this trust. At the same time it should be recognized that we earn the right to move into another's space. Earning that privilege is based on courtesty and respect, both verbally and nonverbally. Societal mores influence social distance. Should questions arise, concerns should be openly discussed. The "people-person" is sensitive to the feelings of others. Another may not be intentionally blunt, just hold a low preference for "reading" the signs that indicate feelings. Acknowledging another's feelings, coupled with acceptance of the individual in his/her own right, create a learning environment supportive of learning (Hamachek, 1969).

The student who fails to attend to body language or facial expression may "miss" important nonverbal signals. These gestures comprise a substantial portion of classroom communication. Cues and signals vary by classrooms, however, it is fair to note that learners inadvertently restrict their learning involvement because attending to nonverbal clues never occurred to them.

Listening

Oliver Wendell Holmes noted that listening to others in an understanding way was perhaps the most effective mechanism for getting along with people. Certainly this has application for classroom interactions, for as Carl Rogers noted "really" hearing someone puts me in touch with them and enriches my life (1969).

Considering the amount of school time spent listening, it would be rewarding to see a direct correlation with academic success. Active listening skills make that a possibility. Attending to the speaker through eye contact, responding to indicate the speaker was heard and use of the speaker's ideas demonstrate listening patterns that influence academic achievement (Flanders, 1971).

Attentive listening is a form of positive feedback, a variable research has identified as supportive of learning (Larrivee, 1980; Anderson, 1979; Harbach and Asbury, 1977). A positive response is afforded learners as their opinions are respected and involvement in the learning process encouraged. Pervasive caring is evidenced by attentive listening and reflects a sensitivity for the thoughts and feelings of others. Style preference related to nonverbal communication also relates to listening for what impacts on learning is often accompanied by gesture and facial expression. Attending to these reinforcing behaviors could be described as "listening between the lines."

Structuring comments focus learning to important points and cue learners to listen for verbal signals (Wright and Nuthall, 1970). Learners with a low preference for making meaning through words or numbers that are heard are encouraged to visualize what is being said. Drawing what is being heard is another option for visual learners. Exercises to translate spoken words into mathematical symbols or diagrams allow learners to support auditory cues with visual representation, thus addressing both learning styles. Persons with a high preference for learning through the spoken word delight in "spelling bees" and similar activities that require listening for facts. Does this describe you?

Learning centers need to provide alternatives for differing styles. Perserverance in the learning task is related to success. Centers that enable students to use a preferred mode are more likely to maintain student contact with curriculum content. Recorded materials support the auditory learner, which also provide listening skill development for learners with a low preference for words you hear.

The instructional technique checking for understanding, focuses on listening behaviors. The small group interaction requires recall of content and learning from another. Active listening skills are used as an integral part

in the summary and anlysis of the topic. Monitering the checking for understanding process, teachers have the opportunity to use listening skills.

Questioning

By virtue of sheer numbers, 300-400 questions per day, questioning skills deserve more attention than they receive. Granted, quantities of questions are asked; however, their quality is seldom examined. It is a given that content and format of questions directly influence the likelihood of student response, yet little thought is given to a relationship with style. Success in instructional response opportunities is related to achievement with teacher questioning style an enhancing or negating factor. Teacher perceptions as well as style reinforce access to supportive teacher-student interactions critical to pupil achievement (Trismen, 1977).

Utilizing effective questioning skills is an art -- an art form calling for appropriate timing, frequency and level of questions (Clark, 1979). Classroom discussions incorporate questions, yet use of relevant questions inserted in printed passages is another way to utilize a variety of questions and formats (Adams and Biddle, 1975). Frequent use of recall or low-order questions in basic skill development supports instruction for learners, but inquiry patterns should not end there. No ceiling on student ability should be inferred by identifying "easy" questions or reserving higher level questions for selected populations. Higher level questions provide the opportunity to think, to have an opinion and to organize fragmented information into a meaningful whole (Watts and Anderson, 1971). Such opportunities should be afforded all students. Granted, the format or supportive teaching behaviors necessarily will vary, yet access to learning remains the criterion.

A teacher behavior that enhances the probability of student response is probing or delving. Classroom climate and organization structure are additional factors which influence the degree of student involvement. Probing refers to

the restatement or clarification of the question and the provision additional information to enable the student to respond (Anderson and Faust, 1973; Baker and Snow, 1972). Implicit in probing is the recognition of the learner's best style or mode of learning. In rephrasing a question, awareness of learning preference is reflected in format. Preference for making meaning through classification or definition, identifying differences or similarities, citing an authority or personal opinion are illustrations of the variety of formats available to help students respond appropriately. The manner in which the question is posed is a major factor in determining whether students respond and the quality of the response. Student achievement is positively related to correctness of response (Brophy and Evertson, 1976) reinforcing the need for inquiry skills that support learning. Another effective delving pattern which provides structure for learners utilizes cause and effect relationships in questioning patterns. Predicting outcomes is a question form closely related to causality. Inquiry practices that differentiate choice, effort and ability help learners relate their success to skill, giving students greater control over their own learning (Mayer, 1975).

A positive classroom climate impacts on the effectiveness of latency, a teaching pattern associated with questioning and delving. Latency refers to the time frame between the initial interaction (question) and the termination of the response. This wait time or thinking time increases the probability of student response and that response is critical to the instructional value of the interaction (Anderson and Faust, 1973). The tone of the classroom allows acceptance of differing time needs and provides a relaxed, yet receptive enrivonment that supports student participation. Messages from nonverbal communication must be congruent with the verbal atmosphere conducive to learning. Sapon-Shevin (1978) noted that the criterion of speed in responding does little to build thinking skills; in fact, the emphasis on time produces negative results for some students. Students whose personal clocks don't mesh

with the tight time expectations of schools are not lost to learning. These learners can gain skills in attending to deadlines and bells. Some flexibility in time lines and learning center activities can be afforded the learner who slowly orders and classifies information. The press for quick response in a competitive environment will not reward this learner.

Encouragement

Feedback, affirmative or corrective, is essential for learning to proceed. It is human nature to want to know another's opinion of one's performance. Assessment of production is the avenue to motivate through positive reinforcement. Quite unconsciously, teachers selectively encourage students perceived as able more frequently than those (seemingly who need it most) who are perceived as less able (Bloom, 1978; Good and Brophy, 1971). To be effective, the teaching pattern of encouragement must be disseminated to all students equally. Reinforcement of the learning performance includes verbal and nonverbal recognition. A sensitivity to student need will determine the appropriateness of public or private praise. Time is essential to the effectiveness of feedback (Nuthall, 1976). When or whatever pattern is used, the reinforcement must be valid, emphasizing the use of a reason why the performance was valued. The term "sustaining feedback" relates to giving the reason for praise. Sustaining feedback also provides direction to proceed in the learning activity (Larrivee, 1980). Additional strength in the use of encouragement was realized if praise comments accompanied grades and substantive information was provided to direct application of the new learning.

Hierarchical content necessitates success at each stage. Reinforcement of that knowledge or skill performance which maintained on-task, or focused learning time, was instrumental in academic achievement (Stallings and Kaskowitz, 1974). The channels by which students achieve academic success directly impact on their availability and encouragement that Flanders (1971) identifies as supportive of learning.

How teachers structure their classrooms determine the opportunities for learning with peers or small groups. Research on team or cooperative classroom patterns report both academic and social achievement superior to competitive or individualized instruction (Johnson and Johnson, 1980; Slavin, 1977). Teacher-directed classrooms provide learning settings for those preferring an authority; however, options for identifying other information referrants also need to be provided. A balance of the three instructional formats: working alone, with peers, or under the direction of an authority-figure provides a needed base for many learners, particulary those with prior learning difficulties. The organizational patterns in any classroom reflect the personal values of that small social system. The rightness or wrongness of subject matter or learning situations impact on encouragement procedures. For the teacher this requires knowing the students well enough to reinforce their achievement in a variety of ways. Building the classroom atmosphere in which success for all students is fostered is reflected in the teacher's enthusiasm and emphasis on learning. Charles Galloway suggests that an effective teacher sends a message of encouragement by living, "I'm glad to be here, because you are here."

Summary

Effective teaching behaviors are based on sound educational principles. Their practical application taxes the talents of the most qualified because their successful function must come as an intregal part of human interactions. How successful these interactions are will be determined to a large extent by what the teacher does to support student achievement. The specific teaching patterns that enhance acquisition of knowledge are identified, the crucial test comes in the how of delivery. The equitable distribution of supportive teaching behaviors coupled with a knowledge of learning styles will more successfully meet the needs of learner and teacher. Mere contact with subject matter does not insure learning. How those experiences become meaningful moves the skills of teaching from dispensing facts to executive level management.

Learning or thinking styles refer to the way individuals process and arrange information and experiences to give those opportunities meaning. Creative management of the learning environment requires the careful linking of teaching behaviors and learning styles.

This linkage better meets the needs of teachers as they utilize their strengths and reduce stress that emerges from teaching in an area of minor preference (Gregorc, 1979). Students, too, benefit through the self knowledge and the opportunity to demonstrate how they learn best. Matching styles operationalizes individualizing instruction for teachers and learners. That linkage of teacher behavior and learning styles creates a partnership essential to successful instruction.

BIBLIOGRAPHY

Adams, R. S. and B. J. Biddle. Realities of Teaching: Exploration with Videotape. New York: Holt, Rinehart and Winston, Inc., 1970.

Anderson, L., et al. "An Experimental Study of Effective Teaching in First Grade Reading Groups," Elementary School Journal, 1979, 79, 193-223.

Anderson, R. C. and G. Faust. Educational Psychology. New York: Dodd-Mead, 1973.

Aspy, David and F. Roebuck. Kids Don't Learn From People They Don't Like. Amherst, MA: Human Resources Development Press, 1977.

Baker, K. D. and R. E. Snow. Teacher Differences as Reflected in Student Aptitude Achievement Relationships. Stanford: School of Education, Stanford University, 1972.

Berliner, D. and B. Rosenshine. The Acquisition of Knowledge in the Classroom. Sacramento, CA: California Commission for Teacher Preparation and Licensing, February 1979.

Berman, P. and M. McLaughlin. Federal Programs Supporting Educational Change, Vol. IV. Santa Monica, CA: Rand Corp., 1980.

Bloom, B. S. "New Views of the Learner: Implications for Instruction and Curriculum," Educational Leadership (April, 1978) 563-576.

Brophy, J. and C. Evertson. Learning From Teaching: A Developmental Perspective. Boston, MA: Allyn and Bacon, 1976.

Brophy, Jere. "Teacher Behavior and Its Effects," Journal of Educational Psychology, 1979, 71, 733-750.

Buchanan, Barbara. "Learning Styles." Final report Desegregation Institute, U.S. Department of Education Grant, 1981, University of Arizona.

Carroll, J. B. "A Model of School Learning," Teachers College Board, 64:723-733, 1963.

Clark, Christopher. "The Effects of Teacher Practice on Student Learning and Attitudes in Small Group Instruction," Standard Center for Research and Development in Teaching: Technical Report No. 47, 1976.

_____"Do Teachers Make a Difference? A Report of Recent Research on Pupil Achievement." Washington, DC: U.S. Department of Education, U.S. Government Printing Office, 1970, E-58042.

Dunn, R. and K. Dunn. Learning Style Inventory. Research Report. Lawrence, KS: Price Systems, 1977.

Eberhardt, H. An Overview of Cognitive Style. Dallas, TX: Mountain View College, 1980.

Fischer, B. B. and L. Fischer. "Styles in Teaching and Learning," Educational Leadership (January, 1979) pp. 245-254.

Flanders, Ned. Analyzing Teacher Behavior. Reading, MA: Addison-Wesley Publishing Company, 1971, p. 60.

Fourier, M. J. The Effectiveness of Disclosure of Students' Educational Cognitive Style Maps on Academic Achievement in Selected Community College Course. Doctoral Dissertation, University of Missouri-Kansas City, 1980.

Gage, N. L. "The Yield of Research on Teaching," Phi Delta Kappan (November, 1978) p. 229.

Good, T. L. and J. Brophy. Looking In Classrooms. New York: Harper and Row Publishers, 1978.

Gregorc, A. F. Student Learning Styles. Reston, VA: NASSP, 1979.

Hamachek, Don. "Characteristics of Good Teachers and Implications for Teacher Education," Phi Delta Kappan, February, 1969. p. 343.

Harbach, J. and Asbury, T. Human Relations Development, G. Gazda (ed.) 2nd edition. Boston, MA: Allyn and Bacon, Inc., 1977, p. 7.

Hart, L. A. "Three Cheers for Smaller Failures?" Phi Delta Kappan (January, 1983) pp. 303-307.

Hill, Joseph E. Personalizing Educational Programs Utilizing Cognitive Style Mapping. Bloomfield Hills, MI: Oakland Community College, 1971.

Johnson, D. W. and R. Johnson. "Group Processes: Influences of Student-Student Interaction on School Outcomes," The Social Psychology of School Learning. New York: Academic Press, 1980.

Kerman, Sam. "Teacher Expectations and Student Achievement," Phi Delta Kappan (June, 1979) pp. 716-178.

Larrivee, B. "Effective Teaching Behaviors for Mainstreaming," The Pointer, Spring, 1980, 25:3, pp. 28-30.

Munroe, M. J. "Equal Opportunity in the Classroom." Final report Desegregation Institute, University of Arizona, Department of Education, 1981.

Murphy, Joseph, et al. "Academic Press: Translating High Expectations into School Policies and Classroom Practices," Educational Leadership (December, 1982) pp. 22-27.

Neff, H. and J. Pilch. Teaching Handicapped Children Easily. A manual for Classroom Teachers Without Specialized Tranining. Springfield, IL: Chas. C. Thomas, 1976.

Rogers, Carl. Freedom to Learn. Columbus, OH: Charles E. Merrill Publishing Company, 1967.

Rosenshine, B. "Teaching Functions and Instructional Programs." Presentation at NIE Conference, February 25-27, 1982.

Rosenthal, D. and T. Jacobson. Pygmalion in the Classroom. New York: Holt, Rinehart and Winston, 1968.

Sanford, J. and C. Evertson. "Classroom Management in a Low SES Junior High: Three Case Studies," Journal of Teacher Education, 1981, 32, 34-38.

Sapon-Shevin, M. "Cooperative Instructional Grants: Alternatives to the Spelling Bee?" The Elementary School Journal, 79 (2) November, 1978, 81-87.

Slavin, Robert. "Cooperative Learning," Review of Educational Research, 1980. 50, 315-342.

Soar, R. "Teacher Behavior Related to Pupil Growth," International Review of Education, Vol. 18 (1972), 508-524.

Stallings, J. A. and D. Kaskowitz. Follow-through Classroom Observation Evaluation, 1972-1973. Menlo Park, CA: Stanford Reserch Institute, 1974.

Tomlinson, T. M. "Student Ability, Student Background and Student Achievement: Another Look at Life in Effective Schools." Paper presented at Conference on Effective Schools, Educational Testing Services, New York, May, 1980.

Trismen, Donald (ed.). "Compensating Reading Study." U.S. Office of Education: Washington, DC, 1977.

Vasquez, James. Locus of Control: Learning and Implications for Educators. Technical Report, Contract DEC-9-74-0005, 1974.

Veldman, Donald and J. Brophy. "Measuring Teacher Efforts on Pupil Achievement," Journal of Educational Psychology, 66 (3) June, 1974, pp. 319-326.

Weinstein, G. and M. Fantini (eds.). Toward Humanistic Education. New York: Praeger Publications, 1970.

Wright, C. J. and C. Nuthall. "The Relationships Between Teacher Behavior and Pupil Achievement in Three Experimental Elementary Science Lessons," American Education Research Journal, Vol. 7 (1970), 477-491.